REMARKS

By this amendment, claims 1-5 have been cancelled and claims 7, 8, 12, 14, and 17 have been amended. Accordingly, claims 6-18 are pending in the present application. The claim amendments are supported by the specification, the accompanying figures, and claims as originally filed, with no new matter being added. Accordingly, favorable reconsideration of the pending claims is respectfully requested.

1. Double Patenting Rejection Under 35 U.S.C. § 101

Claims 1-5 have been rejected under 35 U.S.C. § 101 as claiming the same invention as that of claims 1-9 of prior U.S. Patent No. 6,107,686 to Sandhu et al. (hereinafter "*Sandhu*"). Applicants respectfully traverse.

Claims 1-5 have been cancelled in light of the above double patenting rejection and because an equivalent scope of protection is provided by *Sandhu*. The claims are not cancelled due to the hereinbelow rejection of the claims, which Applicants disagree with. Accordingly, this rejection is now moot.

2. Rejections Under the Judicially Created Doctrine of Double Patenting

Claims 6-18 have been rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-9 of *Sandhu* in view of U.S. Patent No. 5,708,303 to Jeng (hereinafter "*Jeng* '303") for the reasons set forth on pages 9-10 of the Office Action.

This rejection will be addressed when the Examiner indicates the allowable subject matter.

3. Rejections Under 35 U.S.C. §§ 103

Claims 1 and 3-5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 for the reasons set forth on pages 2-4 of the Office Action. Claim 2 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 and further in view of U.S. Patent No. 5,486,493 to Jeng (hereinafter "*Jeng* '493") for the reasons set forth on page 4 of the Office Action.

Claims 1-5 have been cancelled in light of the above double patenting rejection and because an equivalent scope of protection is provided by *Sandhu*. The claims are not cancelled due to the above rejection of the claims under 35 U.S.C. § 103(a), which Applicants expressly disagree with. Accordingly, this rejection is now moot.

Claims 6-9 and 11-13 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 for the reasons set forth on pages 4-6 of the Office Action. Applicants respectfully traverse.

Present claim 6 recites:

> the lower surfaces of each line of said plurality of lines is in **contact** with said upper surface of said single first dielectric layer; and
>
> the upper surface of at least one line of said plurality of lines has thereon a layer of a refractory metal nitride;

(emphasis added). Thus, as depicted in Figure 8 of the present application, by way of example only, the recited structure has a refractory metal nitride layer on an upper surface, but not on the opposing lower surface. Such a structure is simpler, has fewer elements, and requires less fabrication than the structures taught by *Jeng* '303, which teaches a multiple layered metal line (58, 60, 62) as seen in

refractory metal nitride on the upper surface but not on the lower surface thereof. Thus, the presently

recited structure of claim 6 provides a simpler design over *Jeng* '303 while continuing to provide the advantage of reduced capacitance.

Applicant therefore respectfully asserts that claim 6 is patentable over *Jeng* '303. Claims 7-9 and 11-13 depend from claim 6 and are therefore patentable over *Jeng* '303 for at least the reasons presented hereinabove with respect to claim 6.

In addition, claim 7 recites both: "said layer of refractory metal nitride has an electrical insulation spacer layer thereon" and "at least one side surface of the single dielectric material is in contact with at least one side surface of at least one of the plurality of lines." Thus, as recited the electrical insulation layer does not extend down the at least one side surface of at least one of the plurality of lines so as to prevent the single dielectric material from being in contact with the at least one of the plurality of lines. While the Examiner is correct that *Jeng* '303 discloses silicon dioxide liner 56, liner 56 is nevertheless "conformally formed around the interconnect leads." Column 3, lines 23-24; *see also Jeng* '303, Fig. 1. Thus, *Jeng* '303 does not teach or suggest both "said layer of refractory metal nitride has an electrical insulation spacer layer thereon" and "at least one side surface of the single dielectric material is in contact with at least one side surface of at least one of the plurality of lines" because liner 56 conformally covers both the refractory metal nitride and the side surface of the dielectric material 58. *See Jeng* '303, Fig. 1. Further, *Jeng* '303 does not provide a motivation to limit liner 56 to the structure as presently claimed because it uses a completely different method to form its devices – one that would not benefit from the presently disclosed structures of claim 7. The presently claimed "electrical insulation layer" is a spacer that can be remain in place and be incorporated with an overlying dielectric. Specification at page 11, lines 11-

Accordingly, Applicants respectfully submit that claims 6-9 and 11-13 are patentable over the cited references.

Claims 14 and 16-18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 singly or in combination with U.S. Patent No. 6,087,250 to Hyakutake (hereinafter "*Hyakutake*") for the reasons set forth on pages 6 and 7 of the Office Action. Applicants respectfully traverse.

Present claim 14 recites, *inter alia*:

> the lower surfaces of each line of said plurality of lines is in **contact** with said upper surface of said first dielectric layer; and
> the upper surface of at least one line of said plurality of lines has thereon a layer of a titanium nitride;

(emphasis added). Thus, as depicted in Figure 8 of the present application, by way of example only, the recited structure has a titanium nitride layer on an upper surface, but not on the opposing lower surface. Such a structure is simpler, has fewer elements, and requires less fabrication than the structures taught by *Jeng* '303, which teaches a multiple layered metal line (58, 60, 62) as seen in Figure 18. *Jeng* '303 does not teach or suggest a structure wherein the conductive lines have a refractory metal nitride on the upper surface but not on the lower surface thereof. Thus, the presently recited structure of claim 6 provides a simpler design over *Jeng* '303 while continuing to provide the advantage of reduced capacitance.

Additionally, claim 14 recites, *inter alia*:

> the upper surface of at least one line of said plurality of lines has thereon a layer of titanium nitride;
> said layer of titanium nitride has thereon a silicon dioxide spacer layer;

Thus, as presently recited in claim 14, the silicon dioxide spacer layer does not extend down the at least one side surface of at least one of the plurality of lines so as to prevent the single dielectric material from being in contact with the at least one of the plurality of lines. While the Examiner is correct that *Jeng* '303 discloses silicon dioxide liner 56, liner 56 is nevertheless "conformally formed around the interconnect leads." Column 3, lines 23-24; *see also Jeng* '303, Fig. 1. Thus, *Jeng* '303 does not teach or suggest both "said layer of refractory metal nitride has thereon a silicon dioxide spacer layer" and "at least one side surface of the single dielectric material is in contact with at least one side surface of at least one of the plurality of lines" because liner 56 conformally covers both the refractory metal nitride and the side surface of the dielectric material 58. *See Jeng* '303, Fig. 1. Further, *Jeng* '303 does not provide a motivation to limit liner 56 to the structure as presently claimed because it uses a completely different method to form its devices – one that would not benefit from the presently disclosed structures of claim 14. The presently claimed "silicon dioxide spacer layer" is a spacer that can remain in place and be incorporated with an overlying dielectric layer. Specification at page 11, lines 11-17. *Jeng* '303 has no need of nor teaches or suggests any such spacer.

Hyakutake does not overcome the foregoing deficiencies of *Jeng* '303. Applicant therefore respectfully asserts that claim 14 is patentable over *Jeng* '303 singly or combination with *Hyakutake*. Claims 16-18 depend from claim 14 and are therefore patentable over *Jeng* '303 singly or combination with *Hyakutake* for at least the reasons presented hereinabove with respect to claim 14.

Claims 10 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 singly or in combination with *Hyakutake* and further in view of *Jeng* '493 for the reasons

Claims 10, and 15 depend from claims 9, and 14, respectively, and thus include ...

limitations thereof, including the specific limitations discussed hereinabove with respect to the rejections over *Jeng* '303. In addition to being absent from *Jeng* '303, such limitations are also not taught or suggested in *Jeng* '493 or *Hyakutake*. Thus, even if the cited references are combined as suggested by the Examiner, not all of the claim limitations are met.

Claims 4, 12, and 17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Jeng* '303 singly or in combination with *Hyakutake* and further in view of U.S. Patent No. 5,420,075 to Homma et al. (hereinafter "*Homma*") for the reasons set forth on page 6 of the Office Action. Applicants respectfully traverse.

Claim has been cancelled. Claims 12, and 17 depend from claims 6 and 14, respectively, and thus include the limitations thereof, including the limitations discussed hereinabove with respect to the rejections over *Jeng* '303. In addition to being absent from *Jeng* '303, such limitations are also not taught or suggested in *Hyakutake* or *Homma*. Thus, even if the cited references are combined as suggested by the Examiner, not all of the claim limitations are met.

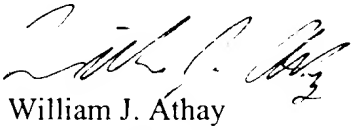
Accordingly, for at least the above reasons, claims 6-18 are not obvious over the cited references. Applicants therefore respectfully request that the rejections of the claims under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

In view of the foregoing, Applicants respectfully request favorable reconsideration and allowance of the present claims. In the event the Examiner finds any remaining impediment to the prompt allowance of this application that could be clarified by a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney.

Dated this 5th day of February 2003.

Respectfully submitted,



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